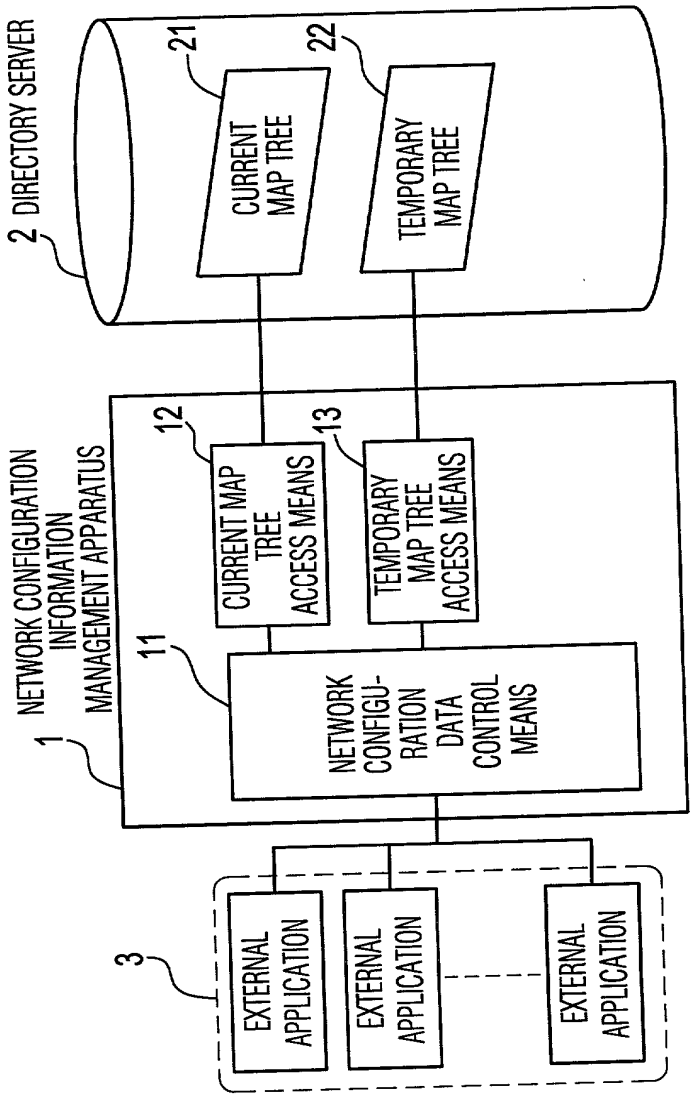
FIG. 1


2 DIRECTORY SERVER
21
CURRENT MAP TREE
22
TEMPORARY MAP TREE
1
NETWORK CONFIGURATION INFORMATION MANAGEMENT APPARATUS
12
CURRENT MAP TREE ACCESS MEANS
13
TEMPORARY MAP TREE ACCESS MEANS
11
NETWORK CONFIGU-RATION DATA CONTROL MEANS
3
EXTERNAL APPLICATION
EXTERNAL APPLICATION
EXTERNAL APPLICATION

Title: SYSTEM AND METHOD FOR MANAGING NETWORK CONFIGURATION DATA, COMPUTER PROGRAM FOR SAME
Inventor(s): Katsuyuki TANAKA
Appl. No.: 09/840,961



FIG. 2(a)

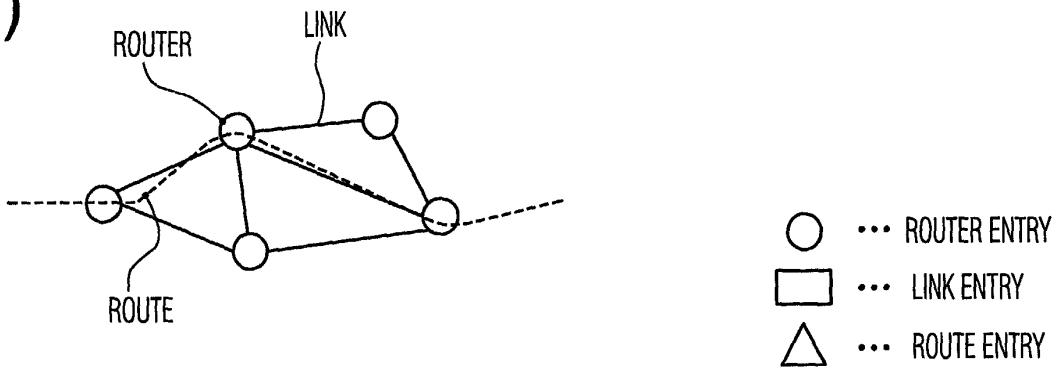
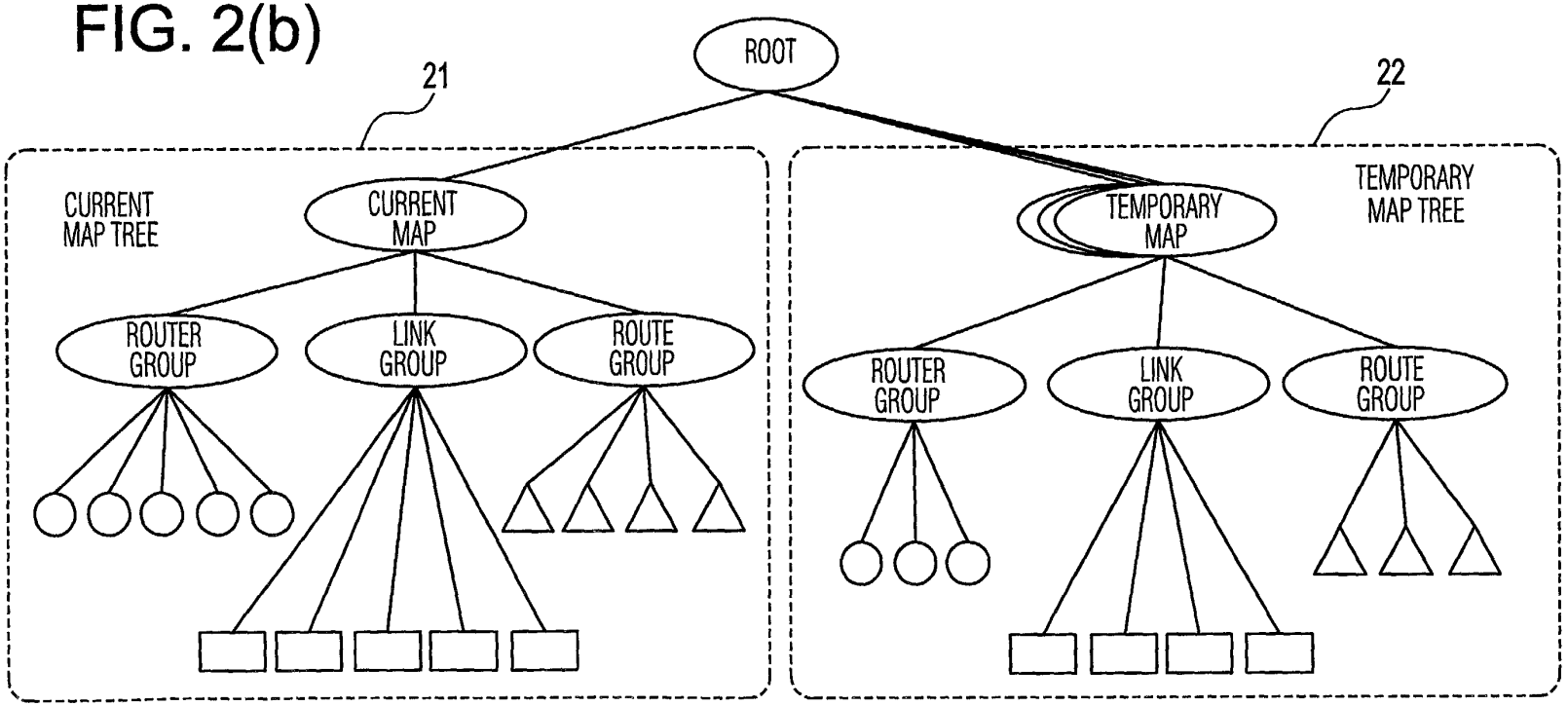



FIG. 2(b)



TOE280" T960H860



Title: SYSTEM AND METHOD FOR MANAGING NETWORK CONFIGURATION DATA, COMPUTER PROGRAM FOR SAME
Inventor(s): Katsuyuki TANAKA
Appl. No.: 09/840,961

FIG. 3(a)

CURRENT MAP CLASS

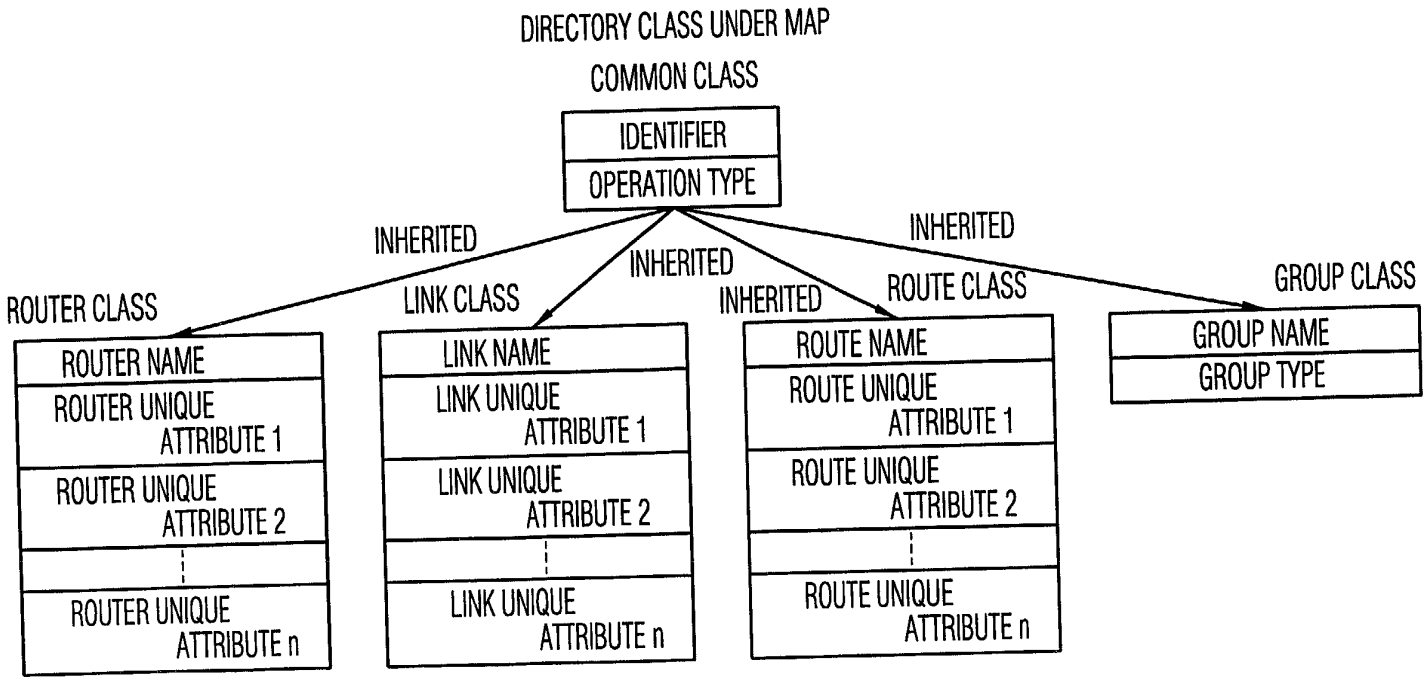
| IDENTIFIER |
|---|
| MAP NAME |
| MAP TYPE |
| MAP UPDATE TIME |

FIG. 3(b)

TEMPORARY MAP CLASS

| IDENTIFIER |
|---|
| MAP NAME |
| MAP TYPE |
| MAP AVAILABILITY |
| TEMPORARY MAP GENERATE TIME |
| EXPECTED TEMPORARY MAP APPLY TIME |
| ACTUAL TEMPORARY MAP APPLY TIME |

FIG. 3(c)



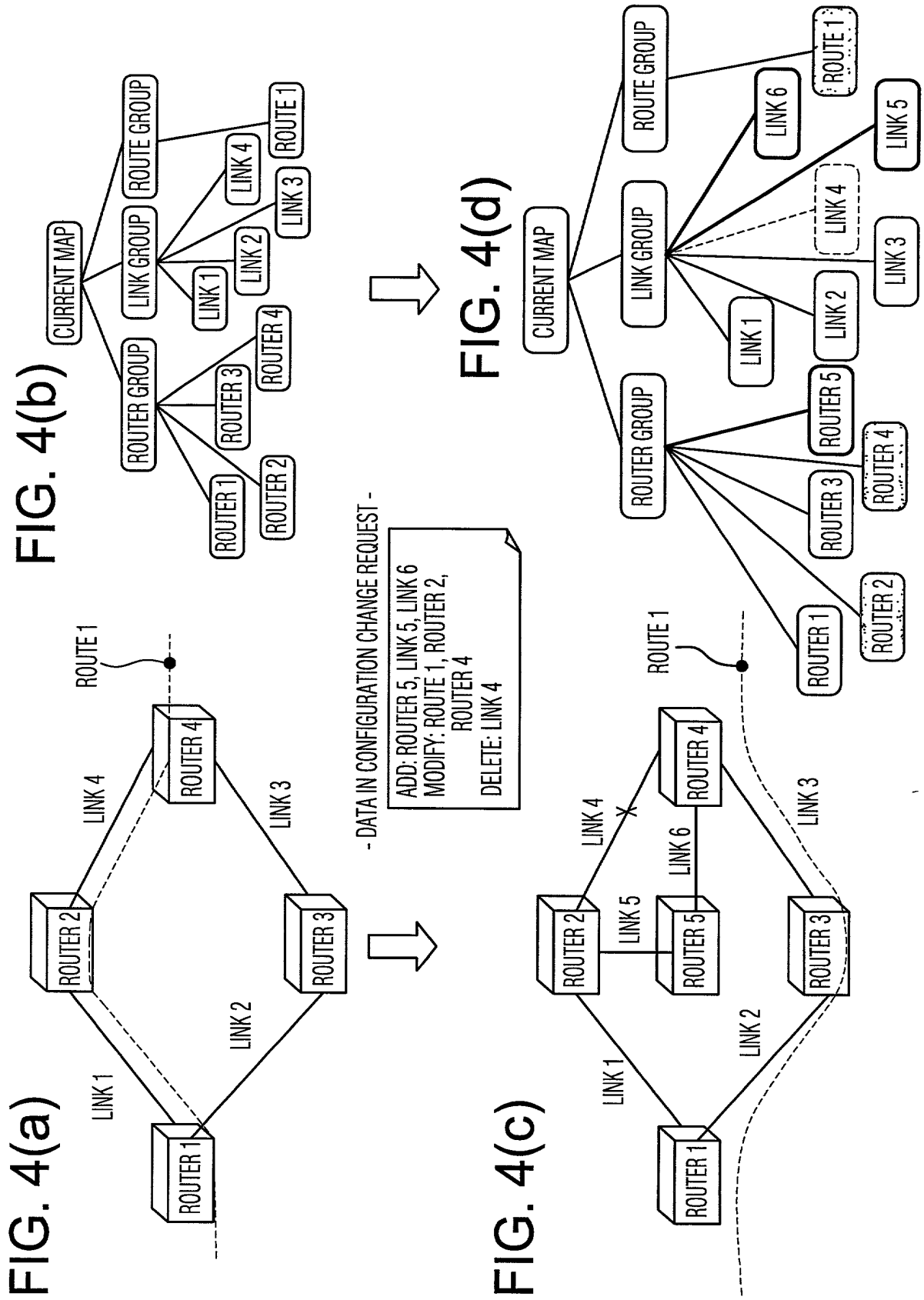


FIG. 4(a)
ROUTE 1
LINK 4
LINK 3
LINK 1
LINK 2
ROUTER 1
ROUTER 2
ROUTER 3
ROUTER 4
FIG. 4(b)
CURRENT MAP
ROUTE GROUP
LINK GROUP
ROUTER GROUP
ROUTE 1
LINK 4
LINK 3
LINK 1
LINK 2
ROUTER 1
ROUTER 2
ROUTER 3
ROUTER 4
- DATA IN CONFIGURATION CHANGE REQUEST -
ADD: ROUTER 5, LINK 5, LINK 6
MODIFY: ROUTE 1, ROUTER 2,
ROUTER 4
DELETE: LINK 4
FIG. 4(c)
ROUTE 1
LINK 4
LINK 6
LINK 3
LINK 5
LINK 1
LINK 2
ROUTER 1
ROUTER 2
ROUTER 3
ROUTER 4
ROUTER 5
FIG. 4(d)
CURRENT MAP
ROUTE GROUP
LINK GROUP
ROUTER GROUP
ROUTE 1
LINK 6
LINK 4
LINK 5
LINK 1
LINK 2
LINK 3
ROUTER 1
ROUTER 2
ROUTER 3
ROUTER 4
ROUTER 5

TOE280" T960h860

# FIG . 5

| |
|---|
| ADD : IDENTIFIER= {ROUTER NAME=ROUTER5, GROUP NAME=ROUTERGROUP, MAP NAME=TEMPORARY MAP1}<br>ROUTER NAME=ROUTER5<br>param1=abc<br>param2=123 |
| ADD : IDENTIFIER= {LINK NAME=LINK5, GROUP NAME=LINKGROUP, MAP NAME=TEMPORARY MAP1}<br>LINK NAME=LINK5<br>param3=xyz<br>param4=111 |
| ADD : IDENTIFIER= {LINK NAME=LINK6, GROUP NAME=LINKGROUP, MAP NAME=TEMPORARY MAP1}<br>LINK NAME=LINK6<br>param3=yyy<br>param4=789 |
| MODIFY : IDENTIFIER= {ROUTE NAME=ROUTE1, GROUP NAME=ROUTEGROUP, MAP NAME=TEMPORARY MAP1}<br>ROUTE NAME=ROUTE1<br>param5=ABCDE |
| MODIFY : IDENTIFIER= {ROUTER NAME=ROUTER2, GROUP NAME=ROUTERGROUP, MAP NAME=TEMPORARY MAP1}<br>ROUTER NAME=ROUTER2<br>param1=bbb<br>param2=345 |
| MODIFY : IDENTIFIER= {ROUTER NAME=ROUTER4, GROUP NAME=ROUTERGROUP, MAP NAME=TEMPORARY MAP1}<br>ROUTER NAME=ROUTER4<br>param1=ccc<br>param2=111 |
| DELETE : IDENTIFIER= {LINK NAME=LINK4, GROUP NAME=LINKGROUP, MAP NAME=TEMPORARY MAP1} |

FIG . 6

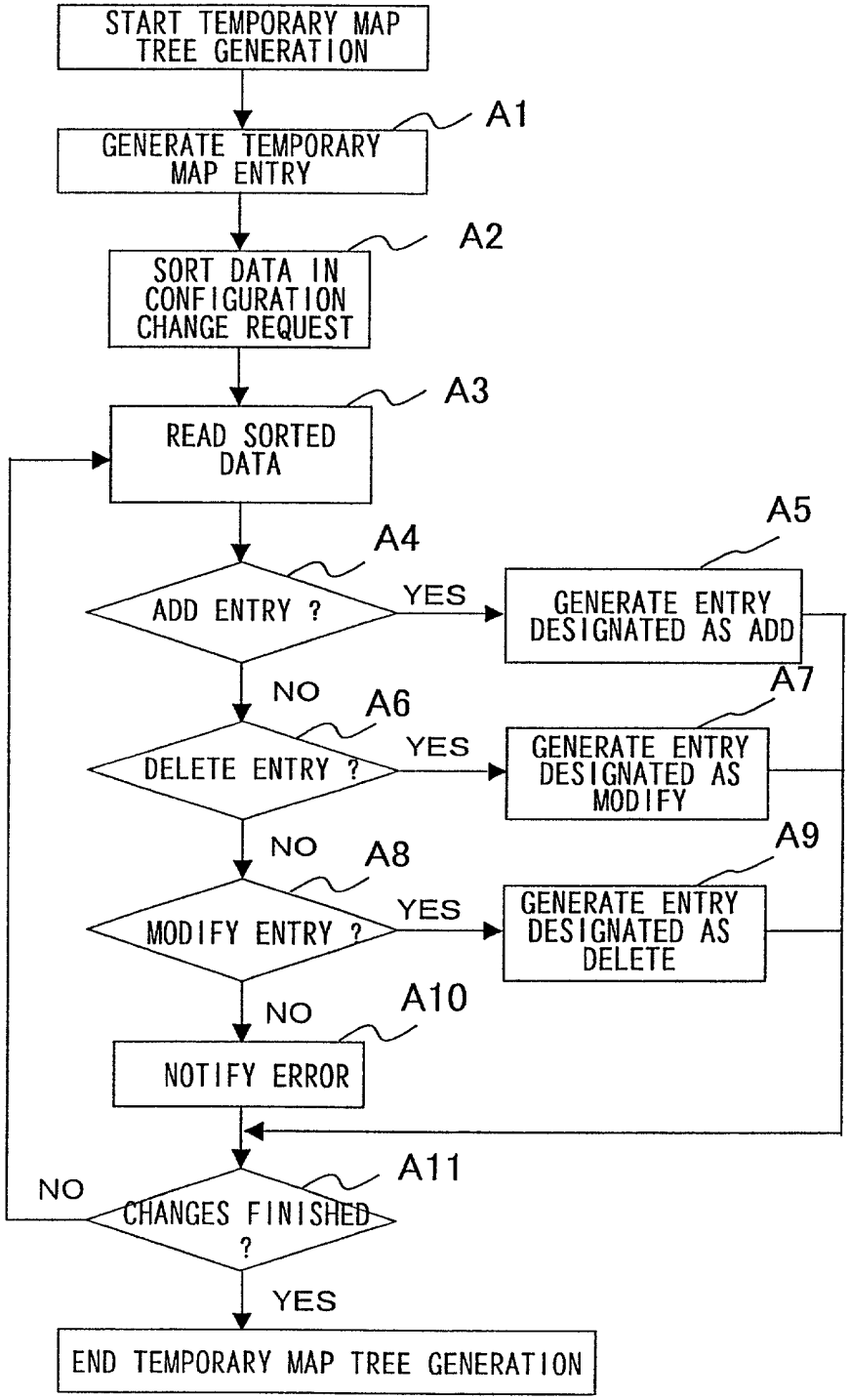

START TEMPORARY MAP TREE GENERATION
A1
GENERATE TEMPORARY MAP ENTRY
A2
SORT DATA IN CONFIGURATION CHANGE REQUEST
A3
READ SORTED DATA
A4
ADD ENTRY ?
YES
A5
GENERATE ENTRY DESIGNATED AS ADD
NO
A6
DELETE ENTRY ?
YES
A7
GENERATE ENTRY DESIGNATED AS MODIFY
NO
A8
MODIFY ENTRY ?
YES
A9
GENERATE ENTRY DESIGNATED AS DELETE
NO
A10
NOTIFY ERROR
A11
NO
CHANGES FINISHED ?
YES
END TEMPORARY MAP TREE GENERATION

FIG . 7

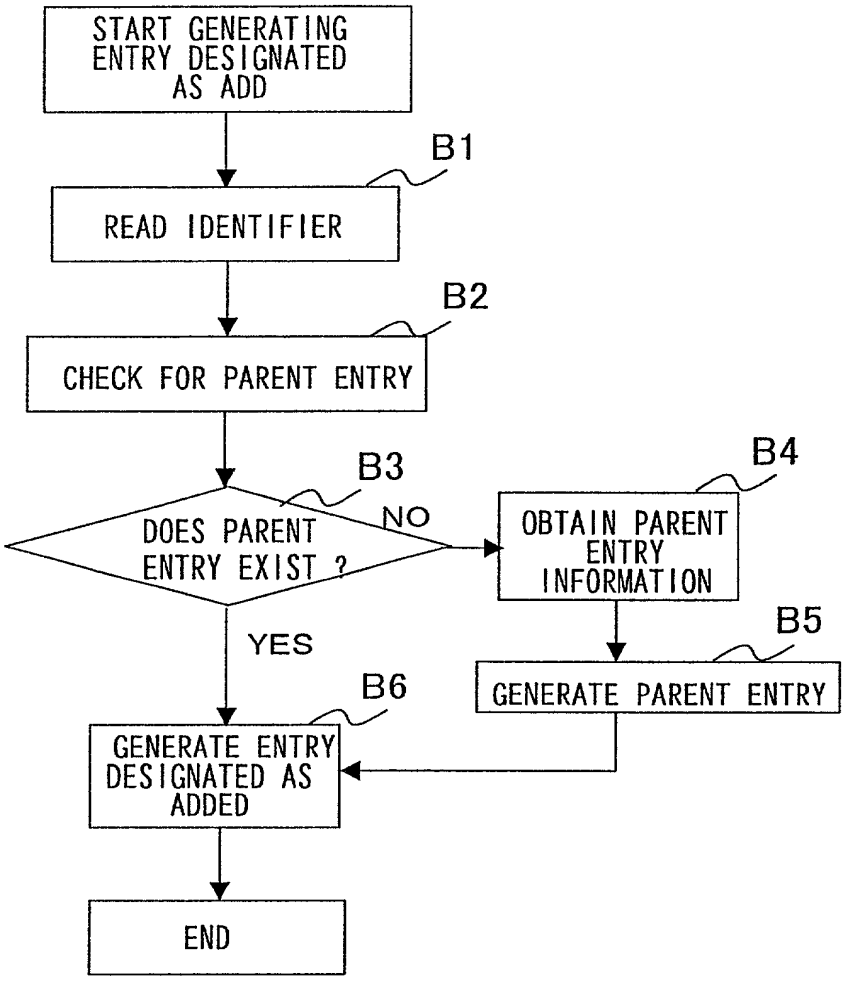

START GENERATING ENTRY DESIGNATED AS ADD
B1
READ IDENTIFIER
B2
CHECK FOR PARENT ENTRY
B3
DOES PARENT ENTRY EXIST ?
NO
B4
OBTAIN PARENT ENTRY INFORMATION
B5
GENERATE PARENT ENTRY
YES
B6
GENERATE ENTRY DESIGNATED AS ADDED
END

FIG . 8

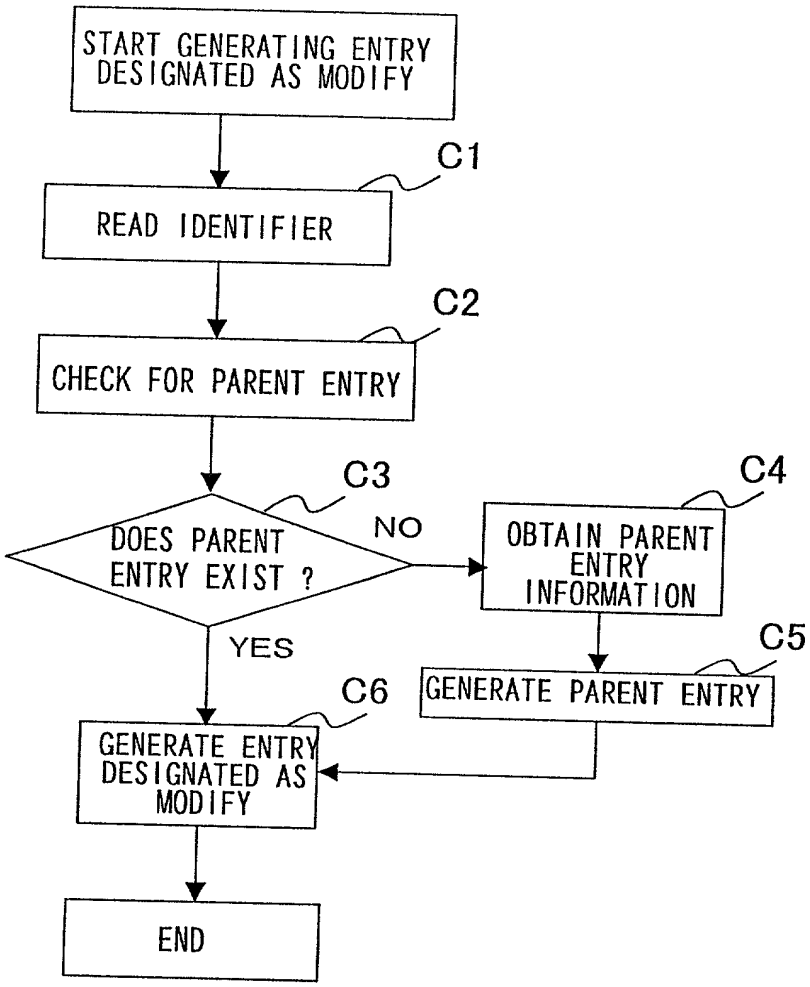
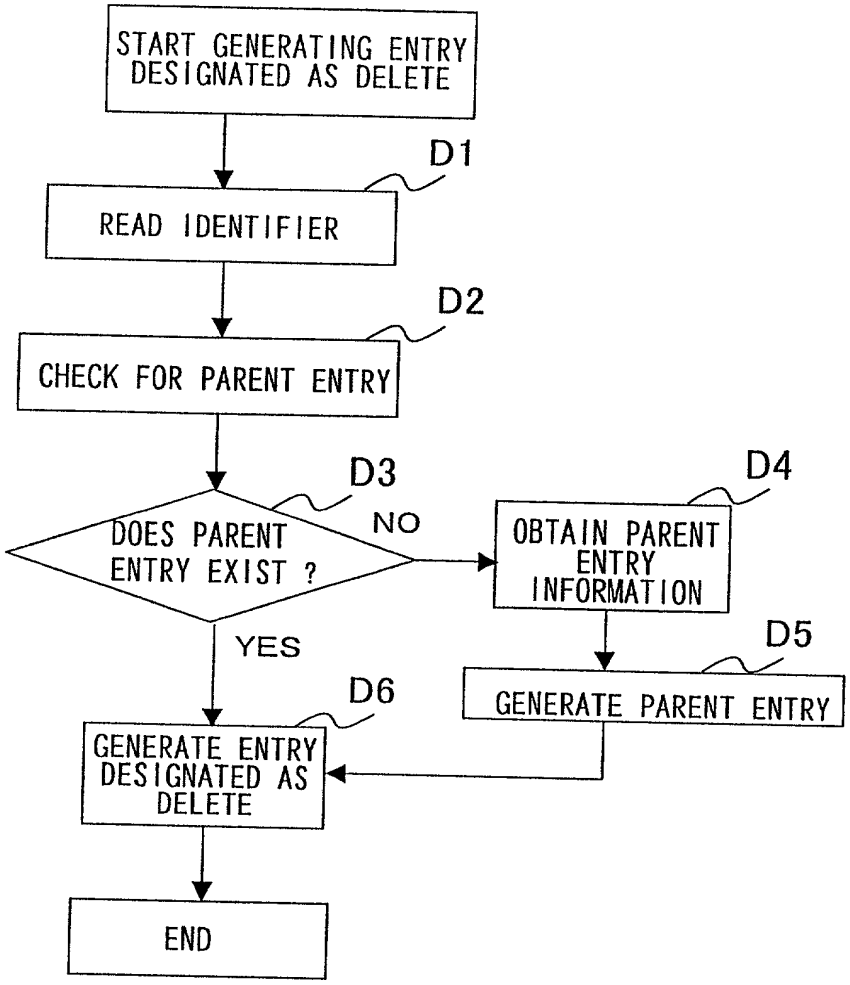

START GENERATING ENTRY DESIGNATED AS MODIFY
C1
READ IDENTIFIER
C2
CHECK FOR PARENT ENTRY
C3
DOES PARENT ENTRY EXIST ?
NO
C4
OBTAIN PARENT ENTRY INFORMATION
YES
C5
GENERATE PARENT ENTRY
C6
GENERATE ENTRY DESIGNATED AS MODIFY
END

FIG . 9


START GENERATING ENTRY DESIGNATED AS DELETE
D1
READ IDENTIFIER
D2
CHECK FOR PARENT ENTRY
D3
DOES PARENT ENTRY EXIST ?
NO
D4
OBTAIN PARENT ENTRY INFORMATION
D5
GENERATE PARENT ENTRY
YES
D6
GENERATE ENTRY DESIGNATED AS DELETE
END

TOE280" T960b860

FIG. 10(a)

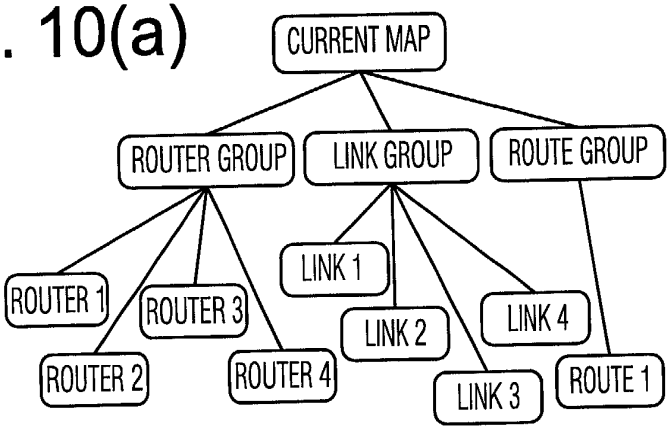



FIG. 10(b)

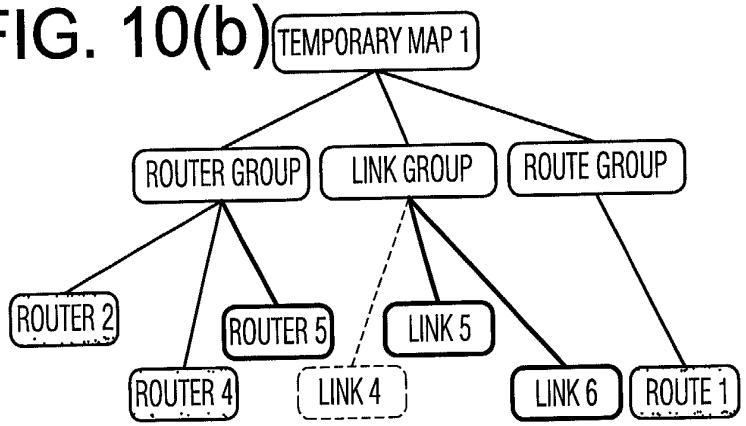
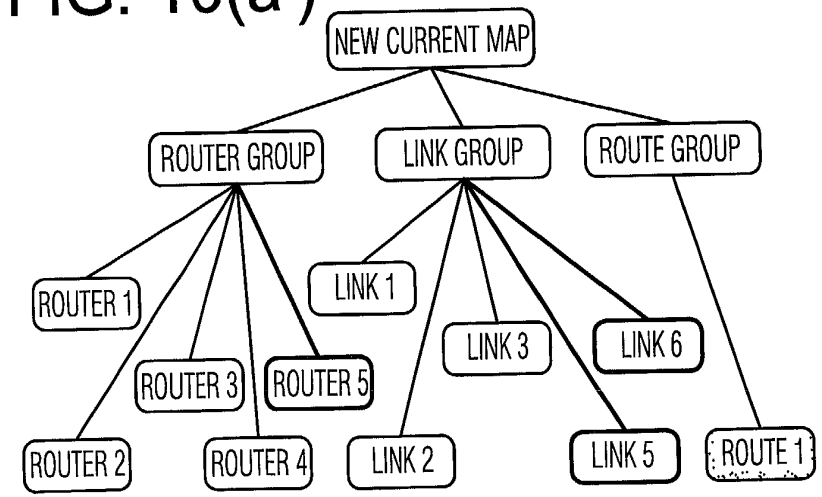



FIG. 10(a')






Title: SYSTEM AND METHOD FOR MANAGING NETWORK CONFIGURATION DATA, COMPUTER PROGRAM FOR SAME
Inventor(s): Katsuyuki TANAKA
Appl. No.: 09/840,961

FIG . 11

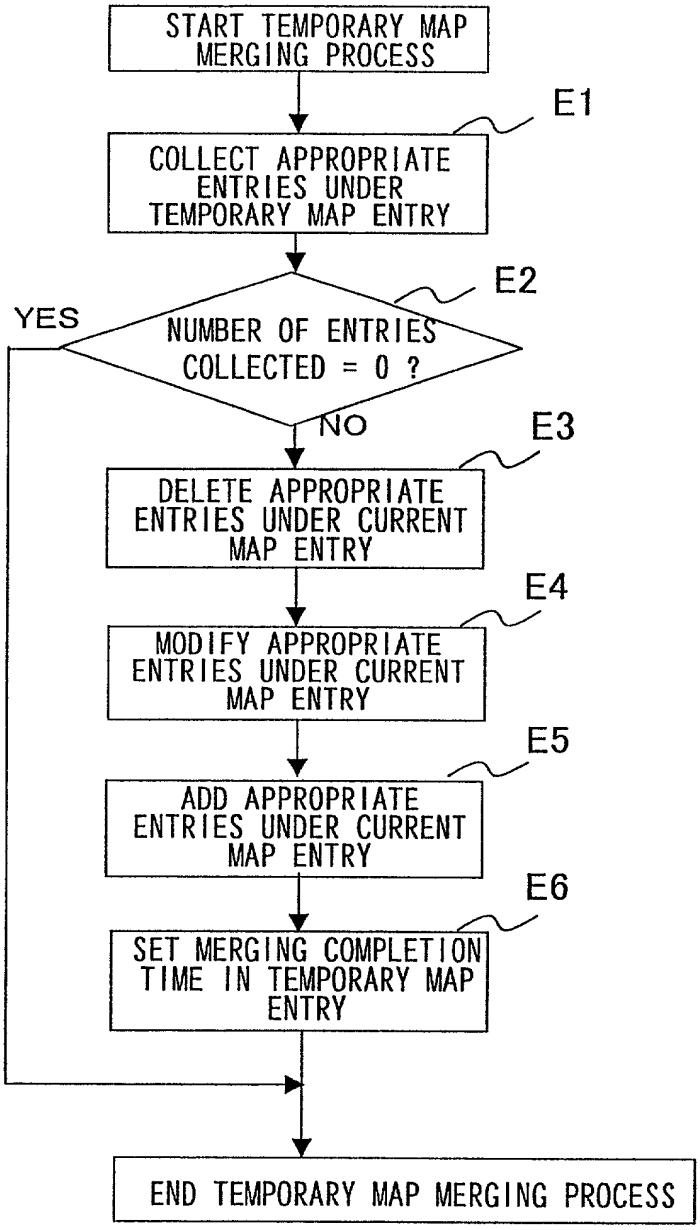

START TEMPORARY MAP MERGING PROCESS
E1
COLLECT APPROPRIATE ENTRIES UNDER TEMPORARY MAP ENTRY
E2
YES
NUMBER OF ENTRIES COLLECTED = 0 ?
NO
E3
DELETE APPROPRIATE ENTRIES UNDER CURRENT MAP ENTRY
E4
MODIFY APPROPRIATE ENTRIES UNDER CURRENT MAP ENTRY
E5
ADD APPROPRIATE ENTRIES UNDER CURRENT MAP ENTRY
E6
SET MERGING COMPLETION TIME IN TEMPORARY MAP ENTRY
END TEMPORARY MAP MERGING PROCESS

FIG. 12(a)

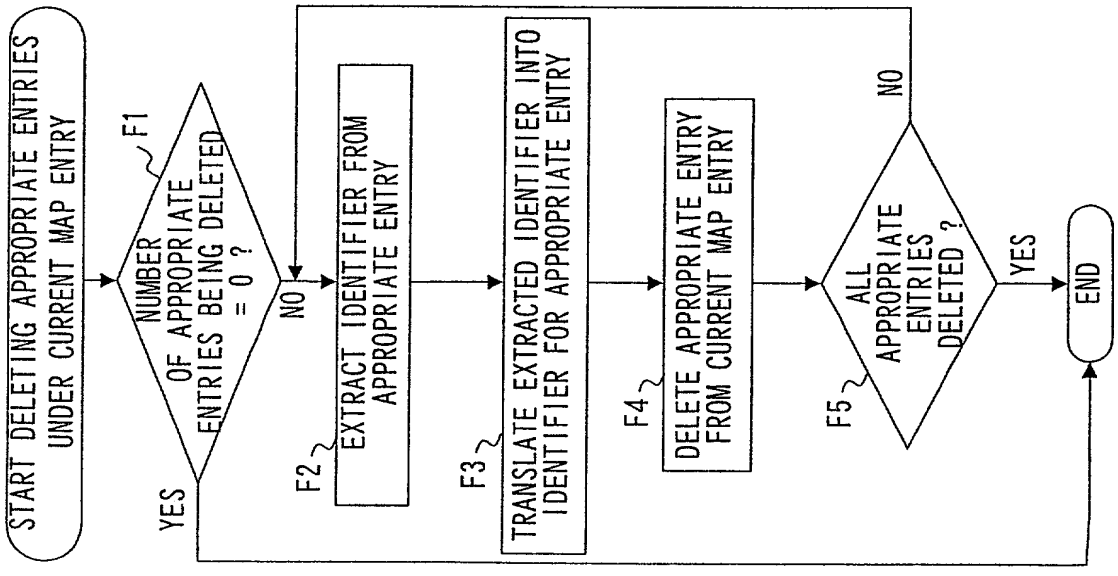



FIG. 12(b)

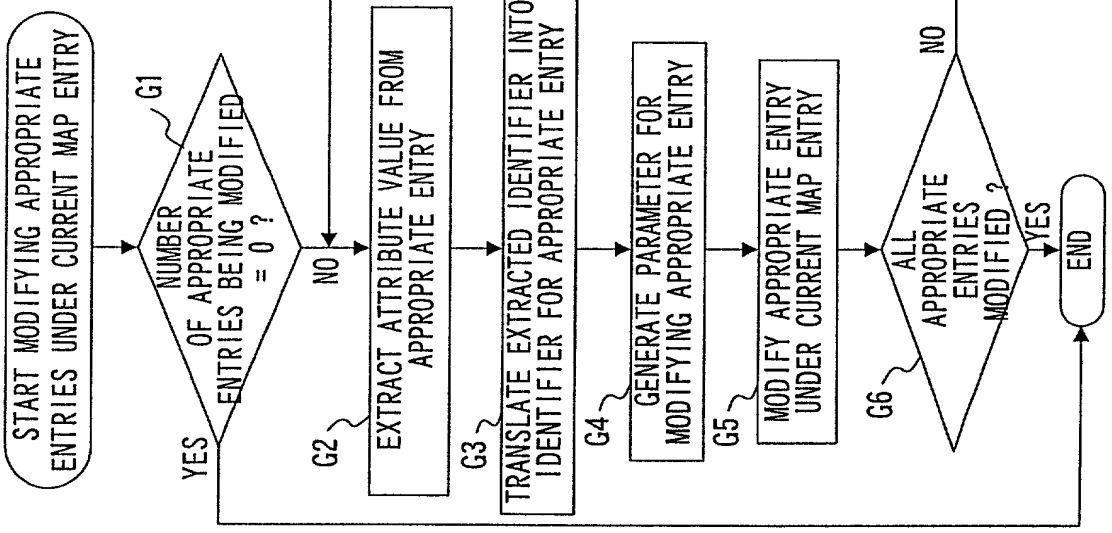



FIG. 12(c)

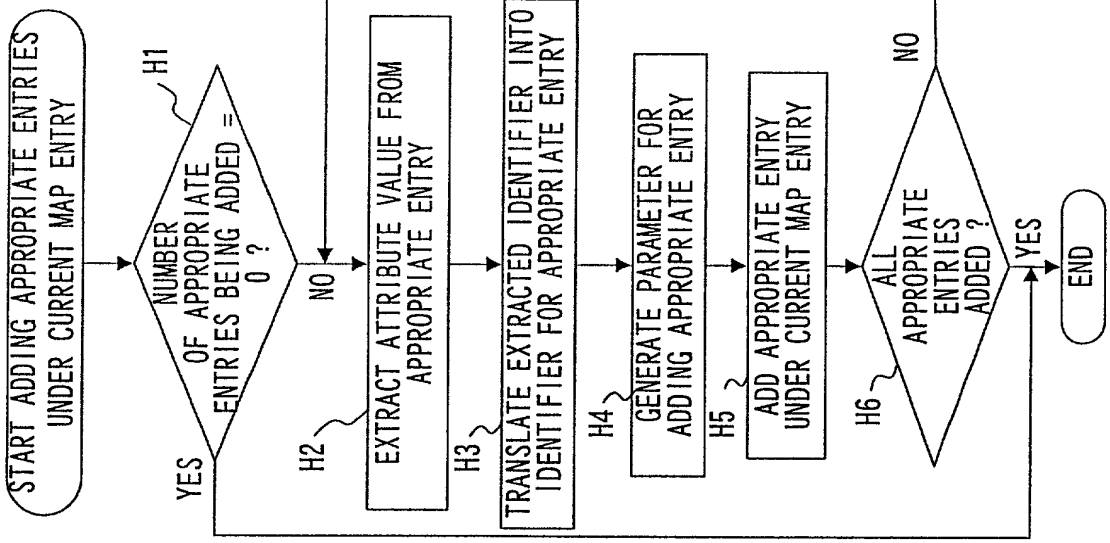


FIG. 13

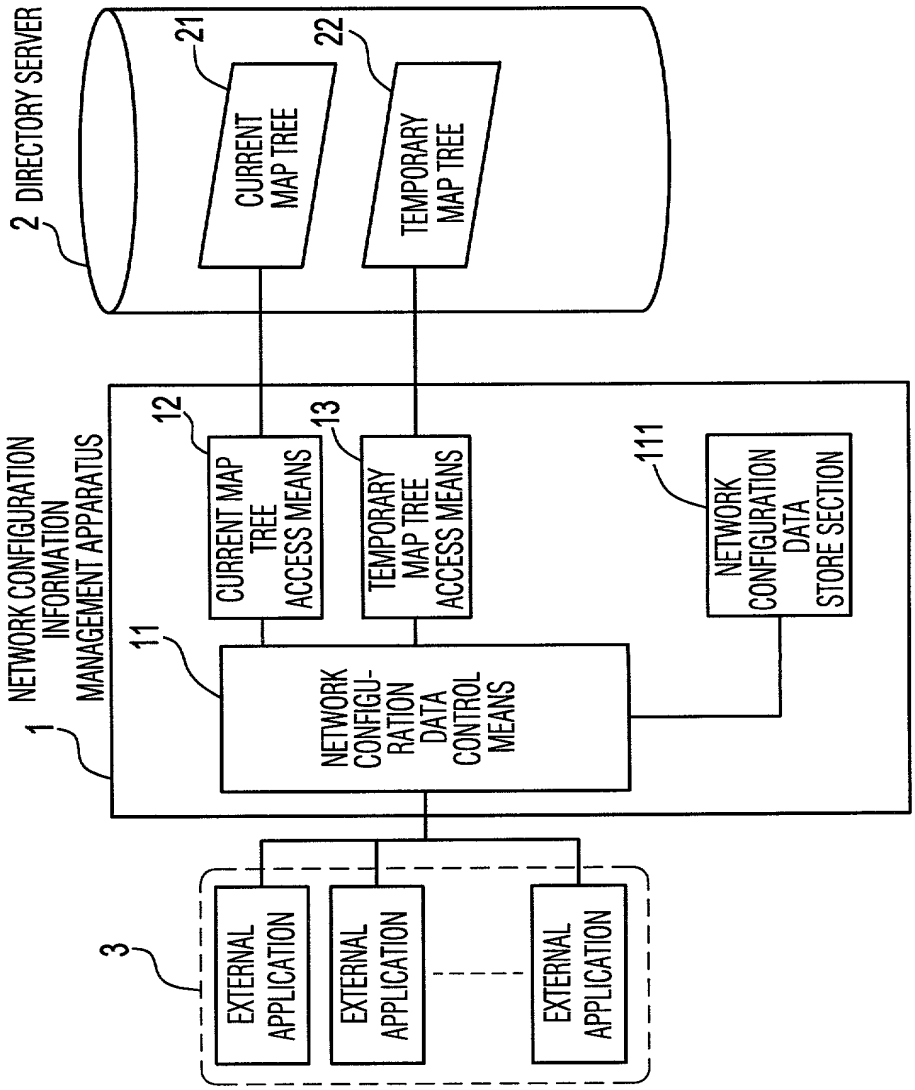

2 DIRECTORY SERVER
21
CURRENT MAP TREE
22
TEMPORARY MAP TREE
NETWORK CONFIGURATION INFORMATION MANAGEMENT APPARATUS
1
12
CURRENT MAP TREE ACCESS MEANS
13
TEMPORARY MAP TREE ACCESS MEANS
111
NETWORK CONFIGURATION DATA STORE SECTION
11
NETWORK CONFIGU-RATION DATA CONTROL MEANS
3
EXTERNAL APPLICATION
EXTERNAL APPLICATION
EXTERNAL APPLICATION

FIG . 14

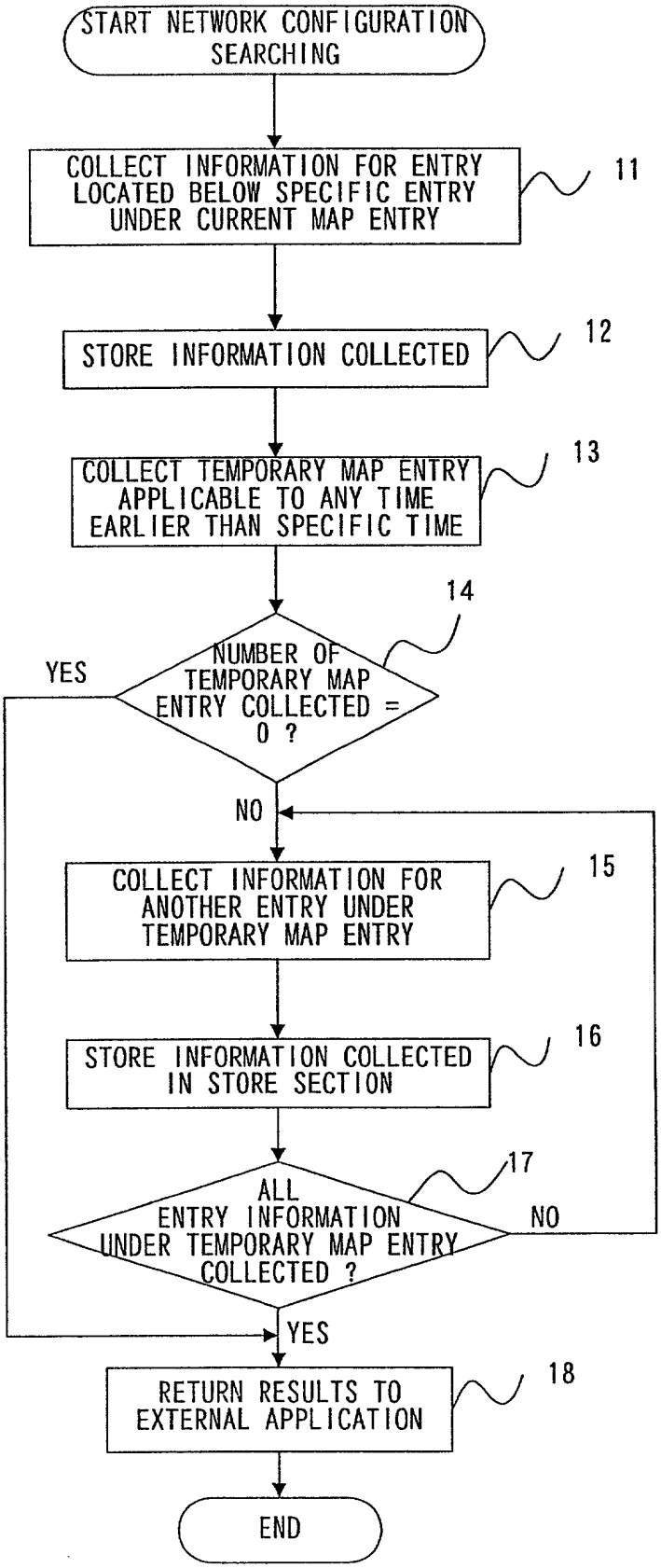

START NETWORK CONFIGURATION SEARCHING
COLLECT INFORMATION FOR ENTRY LOCATED BELOW SPECIFIC ENTRY UNDER CURRENT MAP ENTRY
11
STORE INFORMATION COLLECTED
12
COLLECT TEMPORARY MAP ENTRY APPLICABLE TO ANY TIME EARLIER THAN SPECIFIC TIME
13
NUMBER OF TEMPORARY MAP ENTRY COLLECTED = 0 ?
14
YES
NO
COLLECT INFORMATION FOR ANOTHER ENTRY UNDER TEMPORARY MAP ENTRY
15
STORE INFORMATION COLLECTED IN STORE SECTION
16
ALL ENTRY INFORMATION UNDER TEMPORARY MAP ENTRY COLLECTED ?
17
NO
YES
RETURN RESULTS TO EXTERNAL APPLICATION
18
END

FIG. 15

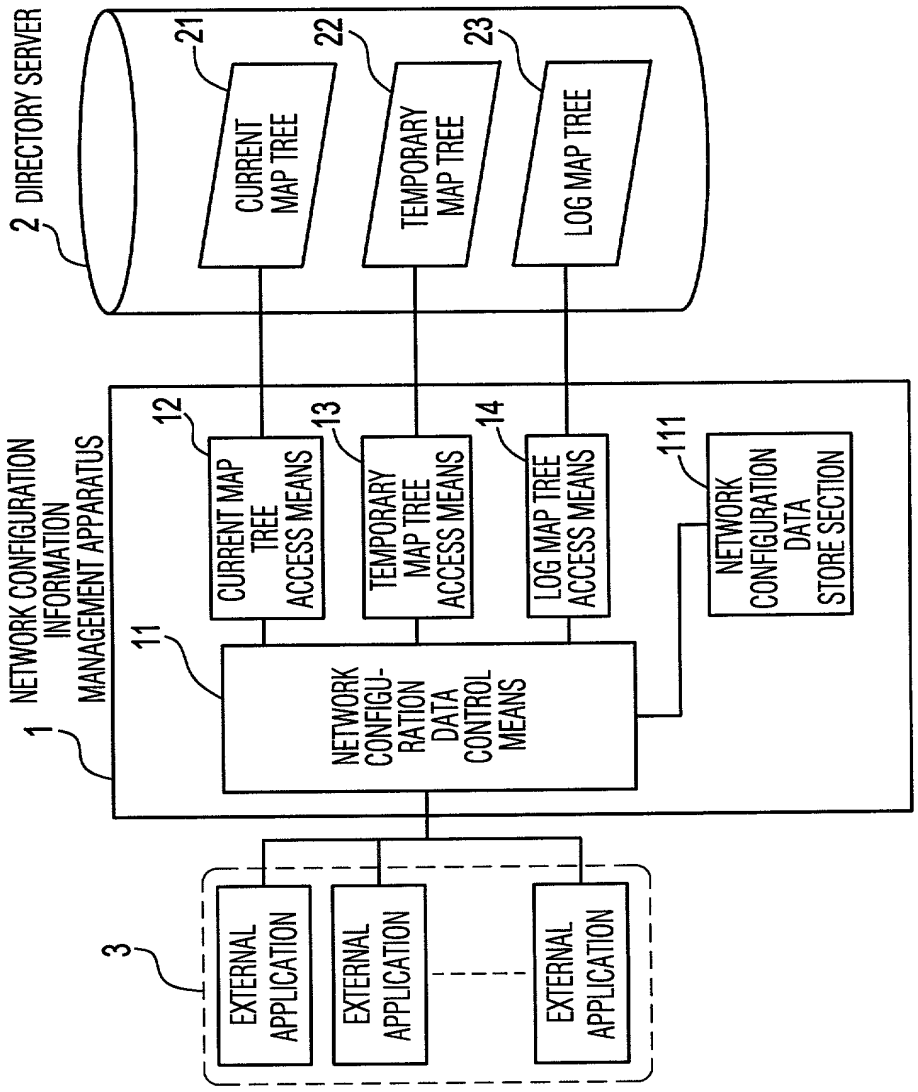

2 DIRECTORY SERVER
21
CURRENT MAP TREE
22
TEMPORARY MAP TREE
23
LOG MAP TREE
1 NETWORK CONFIGURATION INFORMATION MANAGEMENT APPARATUS
12
CURRENT MAP TREE ACCESS MEANS
13
TEMPORARY MAP TREE ACCESS MEANS
14
LOG MAP TREE ACCESS MEANS
111
NETWORK CONFIGURATION DATA STORE SECTION
11
NETWORK CONFIGU-RATION DATA CONTROL MEANS
3
EXTERNAL APPLICATION
EXTERNAL APPLICATION
EXTERNAL APPLICATION

FIG. 16(a)

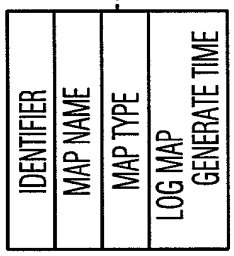
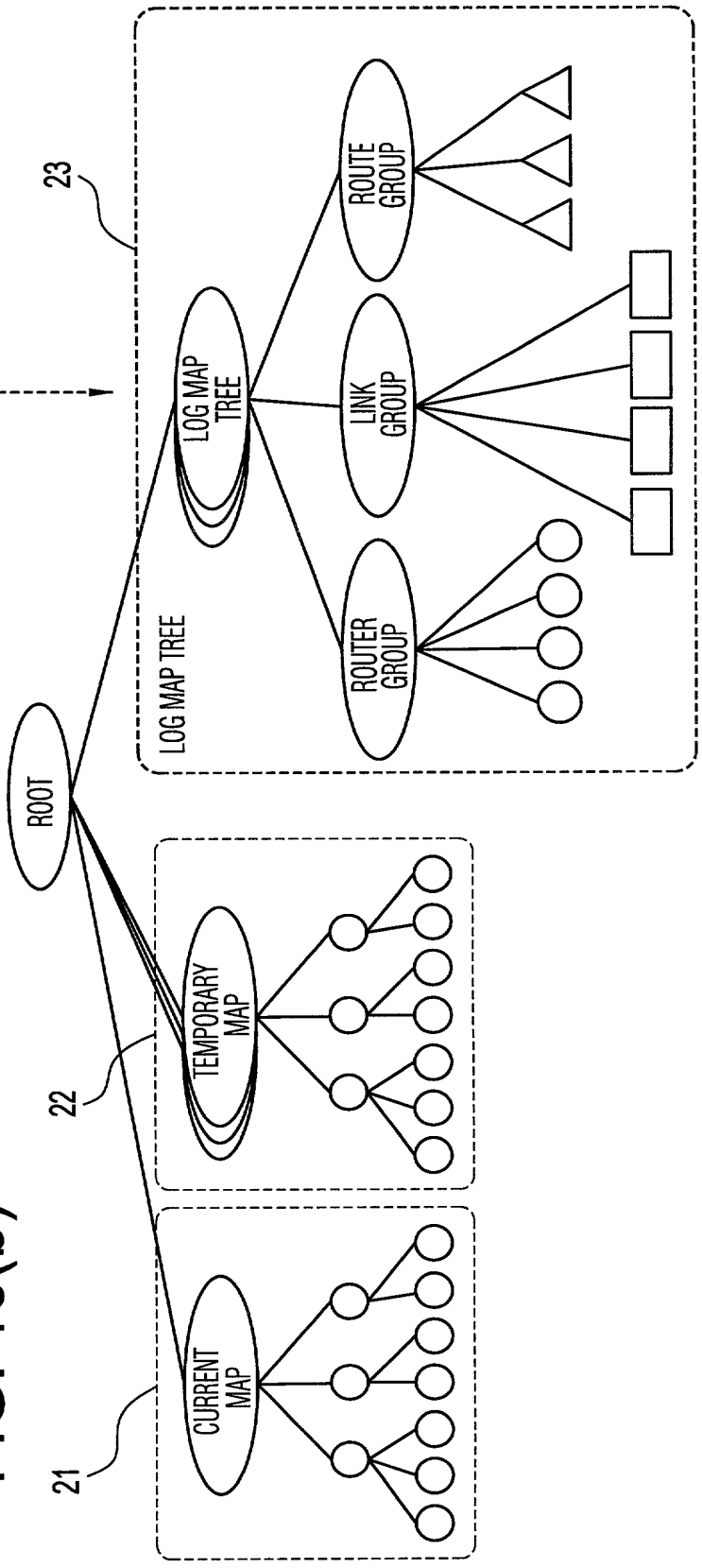



FIG. 16(b)



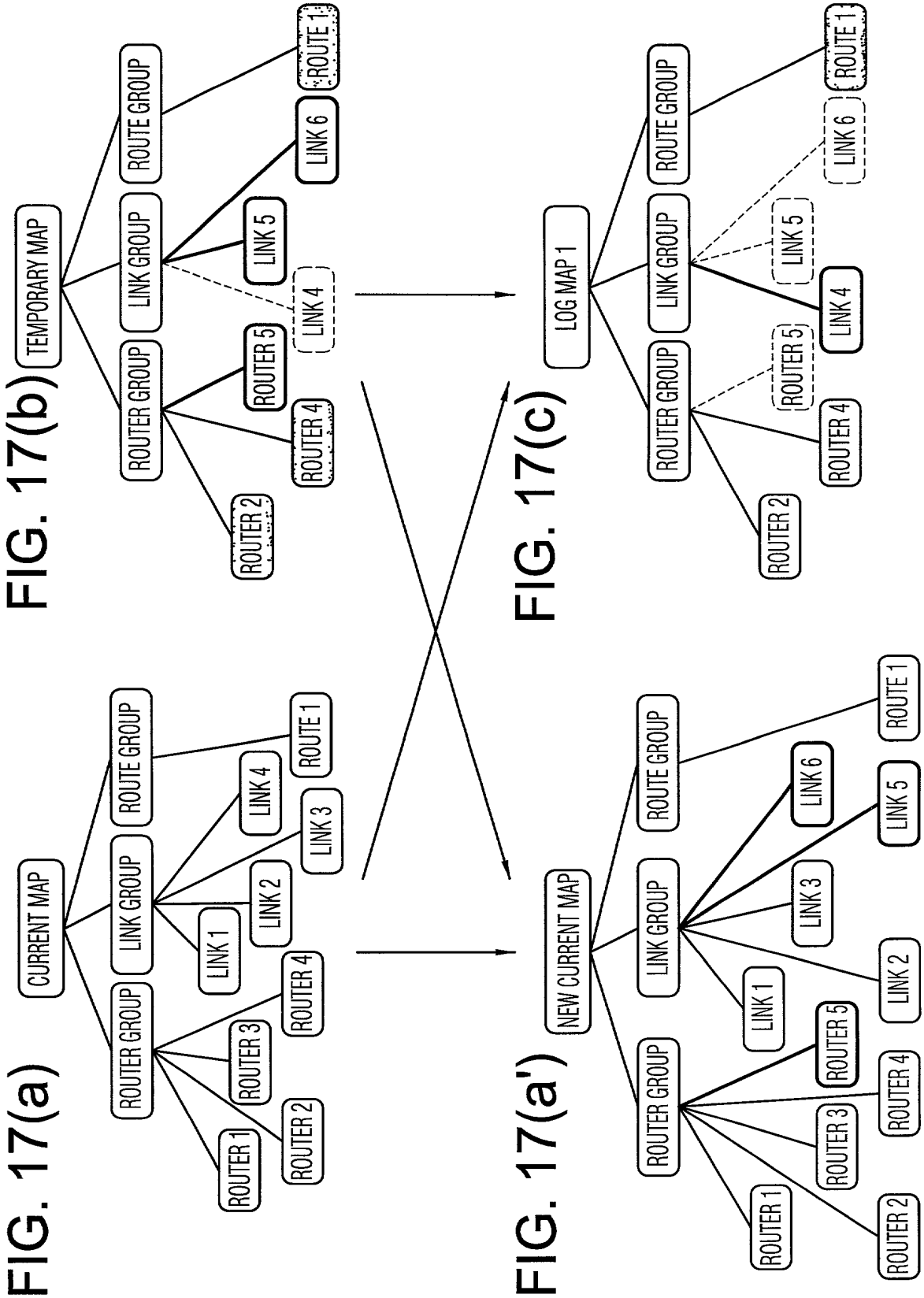


FIG. 17(a)
CURRENT MAP
ROUTE GROUP
LINK GROUP
ROUTER GROUP
ROUTER 1
ROUTER 2
ROUTER 3
ROUTER 4
LINK 1
LINK 2
LINK 3
LINK 4
ROUTE 1
FIG. 17(b)
TEMPORARY MAP
ROUTE GROUP
LINK GROUP
ROUTER GROUP
ROUTE 1
ROUTER 2
ROUTER 4
ROUTER 5
LINK 4
LINK 5
LINK 6
FIG. 17(c)
LOG MAP 1
ROUTE GROUP
LINK GROUP
ROUTER GROUP
ROUTE 1
ROUTER 2
ROUTER 4
ROUTER 5
LINK 4
LINK 5
LINK 6
FIG. 17(a')
NEW CURRENT MAP
ROUTE GROUP
LINK GROUP
ROUTER GROUP
ROUTE 1
ROUTER 1
ROUTER 2
ROUTER 3
ROUTER 4
ROUTER 5
LINK 1
LINK 2
LINK 3
LINK 5
LINK 6

FIG. 18(a)

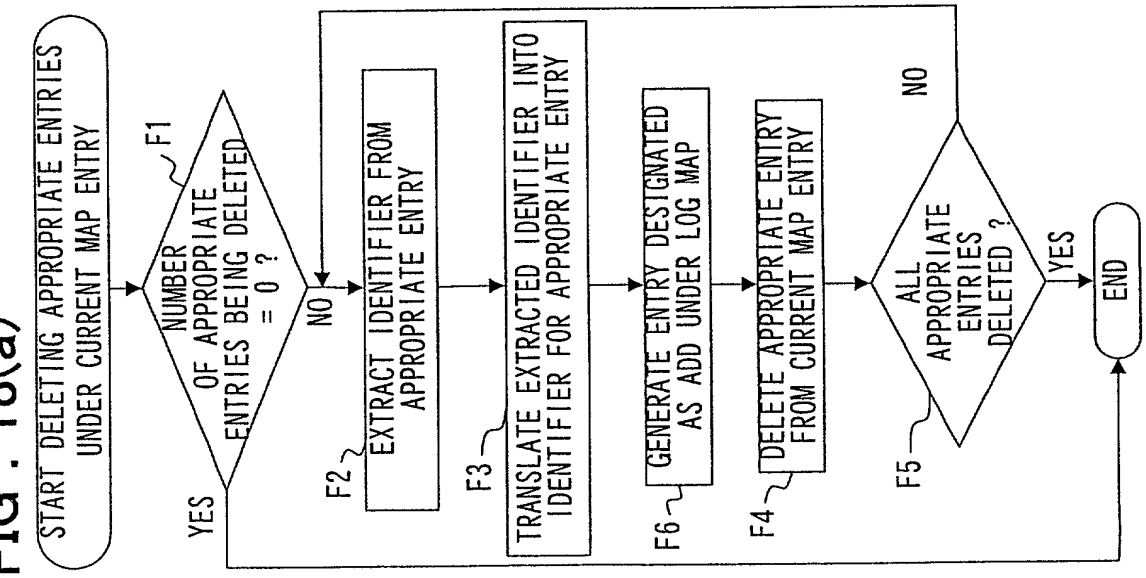



FIG. 18(b)

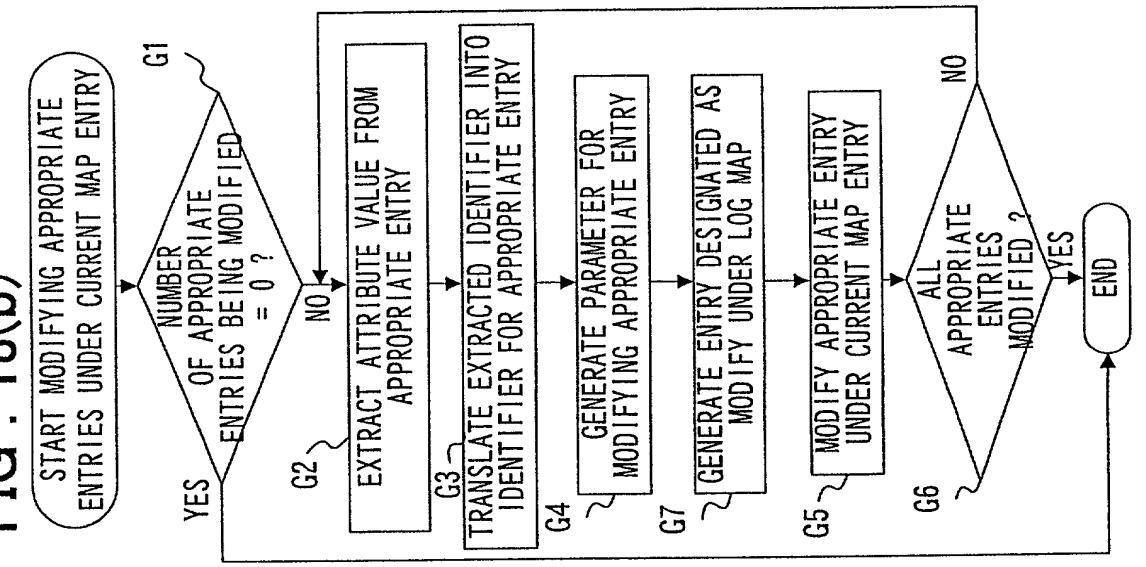



FIG. 18(c)

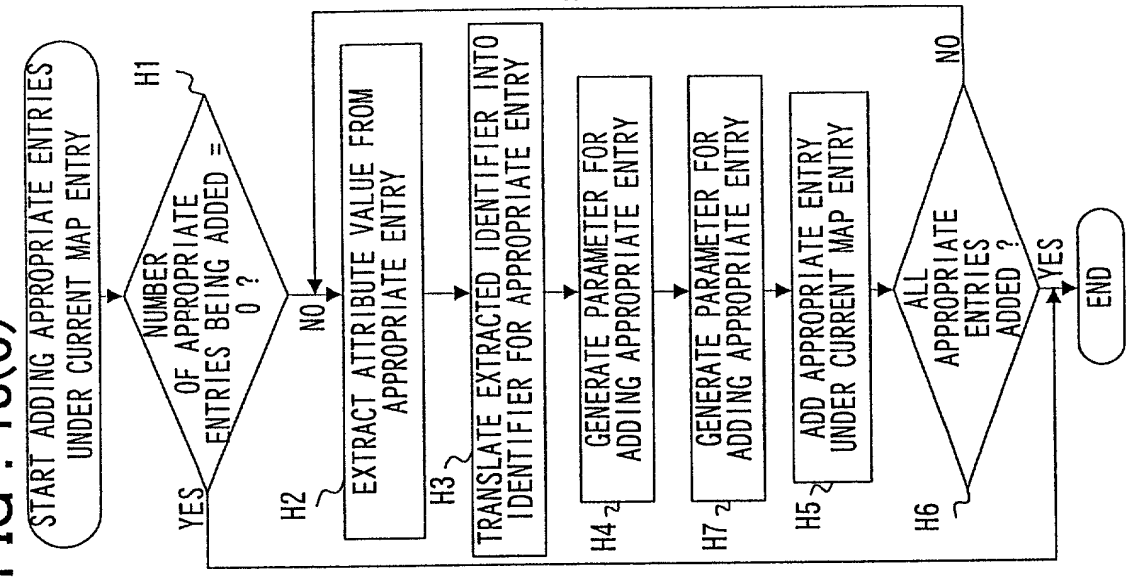
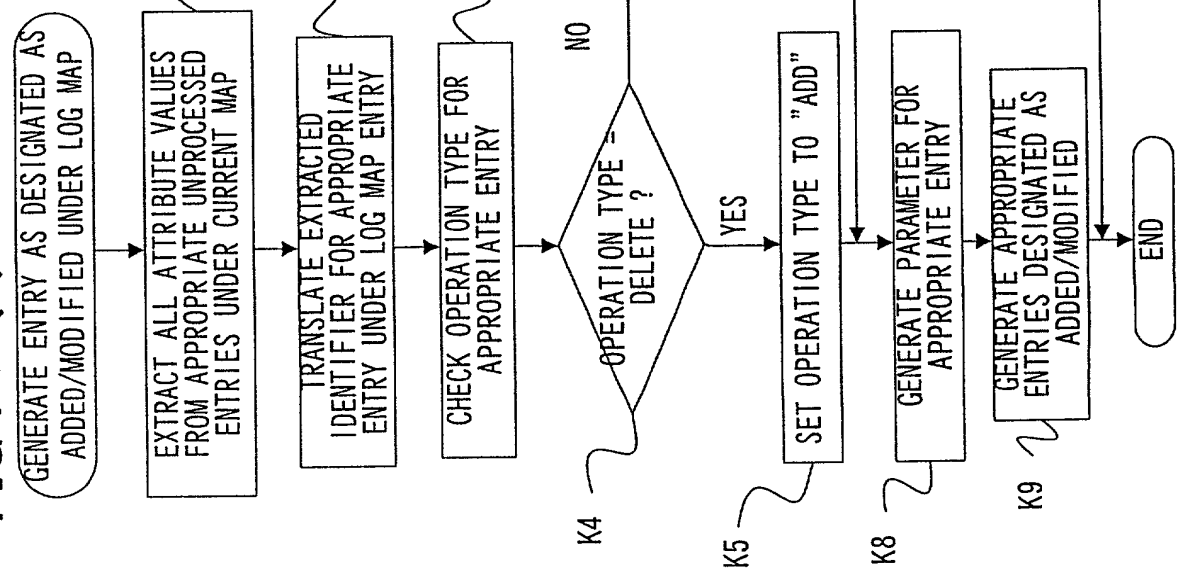


FIG. 19(a)



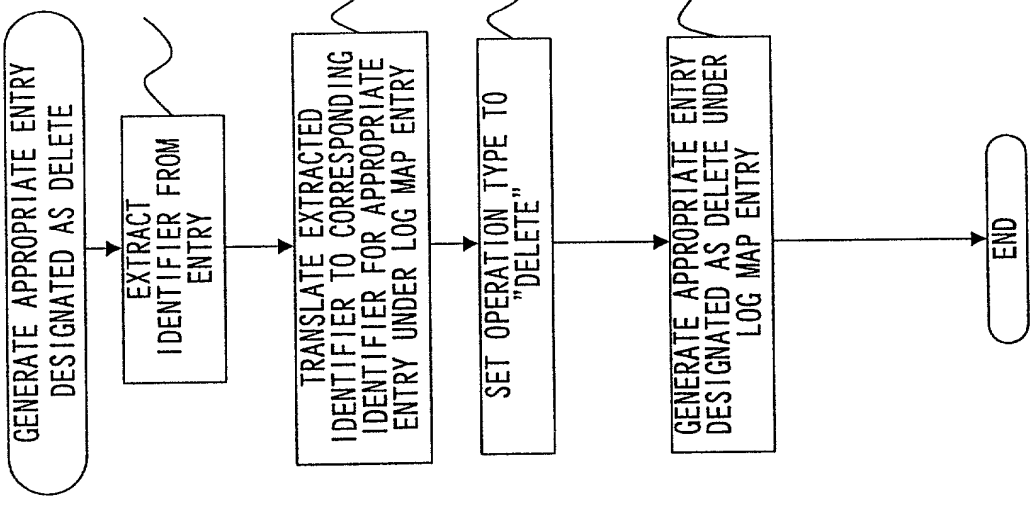


FIG. 19(b)